

CA40NHBLP97
87P62 PT.1

**Proposal for
Development of a remedial
management plan for the
former Lax Property**

**prepared for
The City of Hamilton
by
B.A.R. Environmental**

June 1987



532 QUEEN STREET EAST
TORONTO/CANADA/M5A 1V2

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Development of a Remedial Management Plan
for the former Lax Property

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B.A.R. Environmental
(formerly Booth Aquatic Research Group Inc.)

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1. Introduction

The original management plan for removal of industrial waste from the former Lax Property requires updating in light of evidence that more industrial waste than expected requires removal. Original plans to remove only surface material need to be re-examined and discussed with the Ministry of the Environment.

B.A.R. Environmental has asked Canviro Consultants, a company with considerable expertise in the engineering solutions to remediation of waste sites, to assist them with development of the management plan. Canviro engineers will define the extent of the industrial waste by creating shallow test pits on the property. Using this information they will prepare estimates of the quantities of material which are involved. Discussions with the Ministry of the Environment will then be required to determine a satisfactory plan for dealing with the remaining waste. This plan will include removal of the waste material (as required by the Environmental Protection Act) where feasible and remedial action for any material which it is not feasible to remove. B.A.R. Environmental will continue to act on the City's behalf to attempt to coordinate a solution which is both environmentally responsible and economically feasible.

B.A.R. will subcontract the waste engineering requirements to Canviro while maintaining its coordination and management role. We will work closely with Canviro to ensure that data from previous studies are available to them. We will also provide essential ongoing liaison with the development of the site for the Waterfront Master Plan. This includes insuring that data collected at this stage in the program are also useful for both the environmental assessment process and the requirements for approval under Section 45 of the Environment Protection Act (needed for development of waste disposal site).

2. Scope

The program will involve 3 major tasks:

- Task 1. Defining the extent and nature of the remaining waste.
- Task 2. Developing a plan for removal and/or remediation of the waste which is satisfactory to the Ministry of the Environment.
- Task 3. Developing terms of reference for a contractor to carry out the plan.

3. Personnel

Gillian Booth, a principal of B.A.R. Environmental, will be project manager for this work. She has supervised the environmental work for the Hamilton Waterfront since its inception and is therefore familiar with the environmental and planning issues critical to both the waterfront project and to the site remediation work. Gillian will coordinate between Canviro, the Ministry of the Environment and the City. Her career in environmental consulting began in 1975 working for the World Bank in East Africa on developments of new towns for housing squatters. In 1981 she founded B.A.R. Environmental to pursue practical solutions to environmental problems in Ontario. Richard Rush and his team at Canviro will carry out the engineering aspects to this project. Their resumes and a profile of Canviro are included in their proposal.

4. Costs

We have attached a copy of Canviro's proposed plan for the engineering aspects of this work. The separate total cost summary which is attached, outlines the costs of the subcontract to Canviro as well as the fees and expenses required to fulfill B.A.R.'s coordinating and management role. We have assumed that the City will not provide any technical services such as chemical analysis or surveying. If however any of these services are undertaken by the City, total costs will be reduced according to the schedule on page 14 of the Canviro document.

On completion of this workplan it will remain to ensure that the work is carried out appropriately by the contractor hired to do the clean up. We strongly recommend that the City retain one of the Canviro waste engineers to coordinate the efforts of the contractors. This will help to ensure that only material which has been identified as hazardous is removed and will enable rapid decisions to be made on site as further questions arise. The cost of these services cannot be estimated until the remediation plan is developed but will be outlined in Canviro's final report to the City.

Cost Summary

	Cost	Total
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B.A.R. Environmental:		
Gillian Booth: Project Manager		
10 days @ \$480.	\$ 4,800	
Direct Expenses:		
Travel, Administration	1,000	
Canviro: (see attached proposal)		
Professional fees	10,795	
Direct Expenses	1,900	

Subtotal		\$18,495
Other Expenses:		
Backhoe	1,800	
Chemical Analysis		
(up to 30 tests)	3,450	
Survey of site	5,525	

Subtotal		\$10,775

Total		\$29,270
		=====



B.A.R. ENVIRONMENTAL

532 QUEEN STREET EAST
TORONTO/CANADA/M5A 1V2

(416) 362-2457

THE COMPANY

B.A.R. Environmental is a small group of environmental and aquatic scientists. Our emphasis is on producing high quality work based on sound scientific judgement.

B.A.R. Environmental professionals are experienced in working with both the government and the private sector. Equipment for aquatic biological and chemical assessment is available as required for specific projects. We are able to offer experience and expertise in program design, management of large-scale programs including data analysis and interpretation, and the flexibility to work with professionals from a variety of disciplines. Our associations with other scientists allow us to call on specific expertise when projects warrant it.

Familiarity with the requirements for environmental assessment at all levels of government allows B.A.R. to act efficiently in guiding projects through environmental legislation requirements. Experience has shown that by working with the project managers in the preliminary planning stages, we can offer guidelines to circumvent many of the potential problems that can arise later in a project.

REPRESENTATIVE ASSIGNMENTS

BEATON FARM DEVELOPMENT

Bramalea Limited/General Motors Limited

1987

We worked as part of an interdisciplinary team of planners (Berridge-Lewinberg) and engineers (Totten Sims Hubicki) on the development of a prestige business park to include a new head office for General Motors. The site adjoined Lake Ontario, Darlington Provincial Park and Second Marsh, a class one provincial marshland. Our prime concerns were protection of the Marsh, the Park and McLaughlin Bay of Lake Ontario, and the associated water quality and wildlife, particularly waterfowl. We suggested mitigating measures for stormwater management and reviewed the stormwater management plan produced by Totten Sims Hubicki. The high public profile of Second Marsh resulted in consultation with active interest groups throughout the planning process. A report was prepared highlighting the critical environmental issues and suggesting practical measures to minimize detrimental impacts on the neighbouring environments.

PALEOLIMNOLOGICAL INVESTIGATION OF PHYTOPLANKTON

Ontario Ministry of the Environment

1987

In association with the University of Toronto, B.A.R. is undertaking a paleolimnological investigation of recent changes in phytoplankton standing crop and relative blue-green algal abundance in Lake-of-the-Woods, Ontario.

FISHERIES ASSESSMENT IN GREAT LAKES AREAS OF CONCERN

Fisheries Branch, Ontario Ministry of Natural Resources

1986

B.A.R. is contracted to collect baseline fisheries information by electrofishing at selected areas throughout the Great Lakes Basin to provide information for the Remedial Action Planning Process.

IMPACT OF THERMAL DISCHARGE ON FISH POPULATIONS

Chapleau Co-Generation Ltd.

1986-92

B.A.R. is performing a multi-year study to determine the effect of a discharge of heated water on a fish community in the Chapleau River. B.A.R. designed an impact study to detect changes in the downstream fish populations and is also assessing potential impact through a bioassay exposure of sensitive life stages of walleye.

HAMILTON WATERFRONT ENVIRONMENTAL IMPACT STUDY
City of Hamilton
1986

An environmental impact study was prepared for submission to the Ontario Ministry of the Environment regarding a \$40 million proposed waterfront development. Potential impacts included those from dredging polluted harbour sediments, removal of industrial waste material from the site, construction and operation of the recreational facilities. This study is an integral part of the International Joint Commission Remedial Action Plan for Hamilton Harbour.

DESIGN OF A RECREATIONAL LAKE WITH CHLORINATED SWIMMING AREA
City of Hamilton, in conjunction with Berridge Lewinberg Associates
1986

Specifications were prepared for a 5-acre lake to be built in a recreational urban park. A curtailed off swimming area was suggested to allow creation of a swimming area which was economically feasible and met the standards required by the Province. The rest of the lake will be used for a pan-fish fishery and paddle boating.

NUISANCE BLUE-GREEN ALGAE
Ontario Ministry of the Environment
1986

An Unsolicited Proposal was funded to investigate and develop a method for prevention and mitigation of nuisance blue-green algal blooms in eutrophic lakes. A follow-up study was undertaken in association with Anthony Usher Planning Consultant to examine the socio-economic costs and benefits of mitigating techniques for controlling blue-green algal blooms.

EXPERIMENTAL LAKE NEUTRALIZATION
Ontario Ministries of Natural Resources and of the Environment
1981-1991

B.A.R. is responsible for the coordination and management of a ten year, multi-million dollar research program to evaluate the effects of neutralizing acidified lakes and lakes endangered by acidification.

We have designed and reviewed many related projects under this program. Fish population studies and fish toxicity studies are carried out in conjunction with extensive water quality work as the three major components of the program. Peripheral to these are examinations of the plankton and benthic communities, sediment chemistry and a variety of reports regarding the feasibility of different methods of liming lakes.

Additional contracts under the Experimental Neutralization Program which have been undertaken by B.A.R. are listed below.

Laundrie Lake Shoal Liming
Ontario Ministry of Natural Resources
1984-86

Five shoals in this partially acidic lake were covered with experimental plots of various grades of calcite gravel. Chemistry and in situ bioassays were used to determine the effectiveness of five treatments. It was seen that while some treatments are relatively ineffective, others can promote survival of lake trout eggs and fry which might otherwise succumb to acid stress. This project was one of several experimental liming projects carried out under the Ontario government's Experimental Lake Neutralization Program.

Trout Lake Liming
Ontario Ministry of the Environment
1984

Trout Lake was part of a long-term program to study the effects of liming on a non-acidic lake that was threatened with acidification from acid rain. The dynamics of liming were studied using models, prior to developing an implementation plan for liming Trout Lake. A Canso water bomber dropping a calcite slurry into the lake was found to be the most cost-effective and satisfactory method for this remote lake.

Bowland Lake Liming
Ontario Ministry of the Environment
1983

Bowland Lake, a 100 ha remote acidified lake north of Sudbury, was limed using 84 tonnes of dry, fine grained calcite dropped from a Canso water bomber. B.A.R. designed the specifications for the project including modelling the anticipated results using a Swedish developed model. This lake liming was studied as part of the Ontario government's Experimental Lake Neutralization Program.

Fish Stock Assessment
Ontario Ministry of Natural Resources
1983-84

An intensive research project was implemented under the COED-NEED program to investigate fish populations in three Ontario lakes. These lakes presently contain fish which may be under stress from acidification of their environment.

Littoral Zone Habitat Mapping
Water Resources Branch, Ontario Ministry of the Environment
1982

B.A.R. was contracted to map the littoral zone flora and fauna communities in two southern Ontario lakes. This provided a baseline description of the lakes for the purpose of an environmental assessment of major perturbations which were forecast.

DISPOSAL OF HAZARDOUS WASTE
City of Hamilton
1985

B.A.R. was retained to design disposal options for several thousand tons of contaminated soil from a landfill site in Hamilton. Industrial waste which had been dumped illegally in the landfill site required sampling and identification, appropriate clean-up and disposal at certified sites. A report on the environmental implications of the waste and its clean-up was later included in an environmental assessment study.

CLASS ENVIRONMENTAL ASSESSMENT FOR LAKE NEUTRALIZATION
Ontario Ministry of the Environment, in conjunction with
Michael Michalski & Associates and Anthony Usher Planning Consultant
1985

Prior to initiating an operational program for liming lakes in the province of Ontario, a Class E.A. is required to outline the potential environmental impacts associated with liming and to define environmentally sound procedures. B.A.R. provided technical assistance in the initial stages of preparation of this document for the Ontario Ministry of the Environment. The E.A. was not submitted because the Provincial Government elected to cancel the operational liming program. Due to a change in political leadership, this project never reached the public consultation phase.

LAKE RECLAMATION: BASELINE DATA ANALYSIS
Ontario Ministry of the Environment
1985

As part of the provincial strategy for lake reclamation, six lakes in northern Ontario were investigated. Water and sediment chemistry data and physical lake characteristics were analyzed.

WETLANDS EVALUATION
Ontario Ministry of Natural Resources
1985

A preliminary investigation was made of the wetlands in the Town of Fort Erie. A report to the MNR included maps of each wetland and an evaluation of the major physical and biological characteristics.

HAMILTON HARBOUR
Coombes/Kirkland/Berridge (Architects)
1985-86

As a part of an inter-disciplinary team of planners, engineers and designers, B.A.R.'s responsibilities included guiding the concept design of a \$40 million waterfront redevelopment program through the appropriate preliminary environmental review processes and assisting the design team in preparing an environmentally sound concept. This

project was funded by the City of Hamilton.

INVERTEBRATE IDENTIFICATION

Glenora Fisheries Research Station,
Ontario Ministry of Natural Resources
1985

Identification and enumeration of invertebrates from slimy sculpin stomachs and Shipek samples were undertaken. Results aided in defining sculpin seasonal food intakes and seasonal changes in biomass of invertebrates for a range of depths.

CREEL CENSUS IN CENTRAL ONTARIO LAKES

Acidification Study Group, Ontario Ministry of Natural Resources
1985

Several lakes in the Algonquin Region were investigated to document the effects of acidification on the success of anglers and the harvest of fish. Data entry and preliminary analysis were undertaken using the MNR Creesys computer program.

GIBSON INDIAN RESERVE ACIDIFICATION STUDY

Michael Michalski Associates
1985

A review of local and international literature on acidic precipitation was conducted with emphasis on issues relevant to the Gibson Indian Reserve. Programs were designed to assess the impact of acidic precipitation on the Reserve's aquatic resources.

ALGAE DATA ANALYSIS

Ontario Ministry of the Environment
1985

Five hundred lake-years of data collected by MOE districts were compiled and analyzed to determine any significant correlations between the physical characteristics of the lakes and the appearance of blooms of odour producing algae.

ENVIRONMENTAL ASSESSMENT OF PROPOSED AGRICULTURAL DRAINAGE

Cumming Cockburn & Associates
1984

An environmental appraisal of the effects of a proposed agricultural drain in the Kawartha Region of Ontario was conducted. Means of minimizing effects of drainage were also pursued. This project was funded by the Kawartha Region Conservation Authority.

FISHERIES ASSESSMENT IN CENTRAL ONTARIO LAKES

Acidification Group Study, Ontario Ministry of Natural Resources
1984

Several lakes in the Algonquin Region were investigated to document

the effects of acidification on fish populations. A detailed field report and preliminary computer analysis were provided to the Ministry of Natural Resources.

REVIEW OF DRAFT ENVIRONMENTAL ASSESSMENT FOR BRUCE ENERGY CENTRE
Canadian Environmental Law Association
1983-84

B.A.R. was retained to comment on the Draft Environmental Assessment of Ontario Hydro to develop an industrial complex adjacent to the Bruce Energy Centre. Impacts on terrestrial and aquatic ecosystems were addressed.

STORMWATER DRAINAGE REVIEW
Maple Leaf Estates
1983

A technical review was made of environmental assessment reports pertaining to the effects of stormwater damage from a new development on the ecology of Lake Simcoe.

HISTORICAL TRENDS IN LAKE ACIDIFICATION
Environmental Dynamics Section, Ontario Ministry of Natural Resources
1981-82

A two-part review was completed of biological and chemical research undergone in lakes in the acid sensitive regions of Ontario. The information was used to evaluate possible long term trends of lake acidification.

SPOF BOOKLET
Client Services Section, Ontario Ministry of Natural Resources
1981

A review was written of the Provincial Government Strategic Plan for Ontario Fisheries (SPOF). The project included the production of an information booklet for distribution to the public.

LAKE WHITEFISH POPULATION DYNAMICS
Ontario Council of Commercial Fishermen
1981

B.A.R. provided scientific assistance for a study of the population dynamics of lake whitefish in Bay of Quinte, Lake Ontario. The results of the study were used by the Provincial Government to make changes to the commercial fishing regulations in the Lake.

WALLEYE AND LAKE WHITEFISH STUDY
Glenora Fisheries Research Station
Ontario Ministry of Natural Resources
1981

A field program was initiated to examine lake whitefish and walleye



GILLIAN M. BOOTH

Environmental Biologist
Principal of B.A.R. Environmental

Bachelor of Arts
Queens University, 1974

Master of Science
University of Toronto, 1980

Early in 1981 Mrs. Booth founded Booth Aquatic Research Group Inc., since renamed B.A.R. Environmental. She has been actively involved in study design, coordination and report preparation for many of B.A.R.'s projects. Her background in environmental science and experience in the application of environmental regulations make her a useful member of inter-disciplinary teams.

Mrs. Booth has been actively involved in many projects concerned with the effects of acidic precipitation on Ontario's aquatic resources. As coordinator of a \$5 million project for the Province of Ontario, Mrs. Booth is responsible for the logistics of design and implementation of a ten year Experimental Lake Neutralization Program. As the research for her Master of Science degree was centred on effects of acidification on fish eggs and fry, Mrs. Booth is specifically responsible for the bio-monitoring experiments that constitute about one third of the research program.

Other related projects have included research of documents from archival and government sources regarding acid sensitive lakes in Ontario for the Acidic Precipitation in Ontario Study and an acidification study undertaken for the Gibson Indian Band in central Ontario.

Mrs. Booth has developed expertise in the environmental assessment process and was involved in preparing the Class Environmental Assessment for Lake Neutralization, which required both technical knowledge about lake liming and a thorough understanding of environmental legislation in Ontario.

Recently Mrs. Booth has prepared the environmental assessment for a \$40 million waterfront master plan for Hamilton Harbour on Lake Ontario. Working together with the project planners and engineers, Mrs. Booth coordinated participation from industry, public interest groups and staff of the Ministry of the Environment and the Ministry of Natural Resources in an active public consultation program. Mrs. Booth was also involved in the design of a contaminated fill management plan to deal with disposal of industrial waste which had been dumped on the waterfront property.

Examples of other projects in which Mrs. Booth has been involved are included in the company profile.

In 1979 Mrs. Booth completed a research program toward a Master of Science degree studying eight acid sensitive lakes in Ontario. She studied the effects of lake acidification on several species of fish. Laboratory studies on the details of acid induced mortality in fish eggs resulted in better definitions of the mechanisms of stress and gave her considerable experience in the techniques of spawning, hatching and rearing various fish species in culture conditions.

Prior to returning to graduate school in 1978, Mrs. Booth worked with Terraplan Kenya Ltd. in East Africa. This World Bank funded project was aimed at improving the living conditions of 80,000 squatters camped on the shores of the Mithari River in Kenya. Water quality of the river was seriously impaired and the resulting pollution posed a serious health hazard to the community. The inter-disciplinary team involved planners, engineers, architects and biologists working to upgrade the services available to the community.

Recent Publications and Presentations:

Booth, G.M., J.G. Hamilton and L.A. Molot. 1987. Whole-lake and shoal liming in Ontario: in situ bioassays and short-term biological and chemical changes. Water, Air, Soil Poll. in press.

Molot, L.A., J.G. Hamilton and G.M. Booth. 1986. Neutralization of acidic lakes: short-term dissolution of dry and slurried calcite. Water Research 20(6):757-761.

Booth, G.M. 1985. Liming Acidified Lakes and Rivers in Canada: Objectives and Strategies. Presented to Liming Acidic Waters Conference, Albany, NY, October, 1985.

Molot, L.A., J.G. Hamilton and G.M. Booth. 1984. Ontario's Experimental Lake Neutralization Project: calcite additions and short-term changes in lake chemistry. Proc. 3rd Ann. Conf. North Am. Lake Manage. Soc., U.S. Environ. Protect. Agency 440/5/84-001.

Booth, G.M. 1984. Biological effects of liming lakes. Presented to the Ministry of Natural Resources Policy Review Meeting in February, 1984.

Booth, G.M. 1982. A Perspective on Lake Neutralization in Ontario. Presented to the Canadian Society of Environmental Biologists in November 1982.

Booth, G.M. and C.I. Goddard. 1981. Strategic Plan for Ontario Fisheries: an Overview. Ontario Ministry of Natural Resources Report.

Affiliations:

American Fisheries Society
Canadian Society of Environmental Biologists
(Past Secretary, Ontario chapter)
Federation of Ontario Naturalists
North American Lake Management Society

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